

CLAIMS

1. A tire information communication device characterized by comprising:
a transmitting unit detecting a state information of a tire of a vehicle
and outputting its detection signal to an outside as electromagnetic waves;
and

a receiving unit receiving the state information of the tire from the
transmitting unit as the electromagnetic waves near an end portion of an
axle of the vehicle or inside a tire house;

wherein an antenna of the receiving unit is composed of a wire of a
predetermined length positioned inside a cylindrical space having a rotation
locus of the transmitting unit as an outer diameter thereof and having the
axle as a center axis when the tire rotates, the wire being made integral with
a wire harness that is connected to the receiving unit.

2. A tire information communication device characterized by comprising:
a transmitting unit detecting a state information of a tire of a vehicle
and outputting its detection signal to an outside as electromagnetic waves;
and

a receiving unit receiving the state information of the tire from the
transmitting unit as the electromagnetic waves near an end portion of an
axle of the vehicle while being housed in or disposed together with a housing
of a vehicle wheel speed sensor;

wherein an antenna of the receiving unit is composed of a wire of a
predetermined length positioned inside a cylindrical space having a rotation

locus of the transmitting unit as an outer diameter thereof and having the axle as a center axis when the tire rotates, the wire being made integral with a wire harness that is connected to the receiving unit, an output of the state information of the tire being overlapped with an output of the vehicle wheel speed sensor so that both the outputs are outputted by a common line.

3. A tire information communication device characterized by comprising:
a transmitting unit detecting a state information of a tire of a vehicle and outputting its detection signal to an outside as electromagnetic waves;
and

a receiving unit receiving the state information of the tire from the transmitting unit as the electromagnetic waves near an end portion of an axle of the vehicle while being housed in or disposed together with a housing of a vehicle wheel speed sensor;

wherein an antenna of the receiving unit is composed of a wire of a predetermined length positioned inside a cylindrical space having a rotation locus of the transmitting unit as an outer diameter thereof and having the axle as a center axis when the tire rotates, the wire being made integral with a wire harness that is connected to the receiving unit, an output of the vehicle wheel speed sensor and an output of the state information of the tire being modulated so that both the outputs are outputted by a common line.

4. A tire information communication device as recited in one of claim 1 to claim 3, in which the antenna of the receiving unit is disposed such that a side thereof connected to the receiving unit is generally in parallel with a

rotation axis of the tire.

5. A tire information communication device as recited in one of claim 1 to claim 4, in which the antenna of the receiving unit is wound in a coil shape so as to be set in a predetermined length.

6. A tire information communication device as recited in one of claim 1 to claim 4, in which the antenna of the receiving unit is knitted in a knitted and braided shape so as to be set in a predetermined length.

7. A tire information communication device as recited in claim 5, in which the antenna in the coil shape of the receiving unit is wound so as to wind the wire harness therein.

8. A tire information communication device as recited in claim 6, in which the antenna in the knitted and braided shape of the receiving unit is wound so as to wrap the wire harness as a whole therein.

9. A tire information communication device as recited in one of claim 1 to claim 8, in which the antenna of the receiving unit is made into a length $1/4$ that of a wavelength λ of the received electromagnetic waves.

10. A tire information communication device as recited in one of claim 1 to claim 8, in which the antenna of the receiving unit is made into a length of an integral multiple of a wavelength λ of the received electromagnetic

waves.

11. A tire information communication device as recited in one of claim 1 to claim 8, in which the antenna of the receiving unit is made into a length $5/8$ that of a wavelength λ of the received electromagnetic waves.

12. A tire information communication device as recited in one of claim 1 to claim 11, in which the receiving unit detects an air pressure of the tire of the vehicle by a pressure sensor and outputs a detection signal thereof as electromagnetic waves.